

NCDOT ROADWAY PLAN PREPARATION

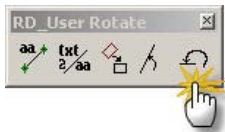
CHAPTER 4 : ROADWAY TOOLS

RD_GRID

Step 1.

Open the **U2547_rdy_pfl.dgn** design file and place in Top View .

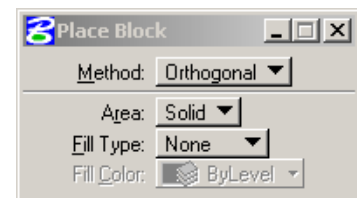
NOTE 1: You must be in **Top View** to place a **Work Profile**.



NOTE 2: (Point of Reference) A 50 scale Profile Sheet dimensions approximately 1500' x 1025'

Step 2.

Select a **scratch level** to draw a block then on your **Main** Tool Frame select the **Place Block** Tool Box



Step 3.

Place a block around your profile or in the **Key-in** text field key in **dx=6000,1025** .



Step 4.

On your **RD_MDLapps** Tool Frame select the **RD_GRID**



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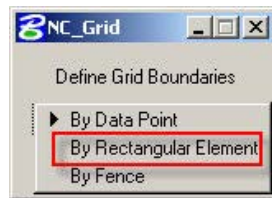
Step 5.

Set your scale to **50**



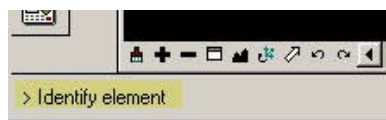
Step 6.

There are three options for creating a work profile in this example we will use **By Rectangular Element**.



Step 7.

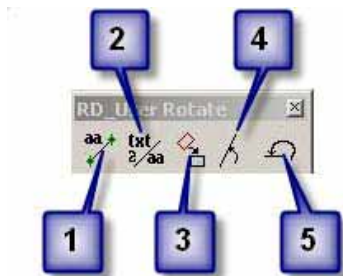
Select the Rectangular Block drawn in **Step 2**



Finished Work Profile



RD_UserRotate

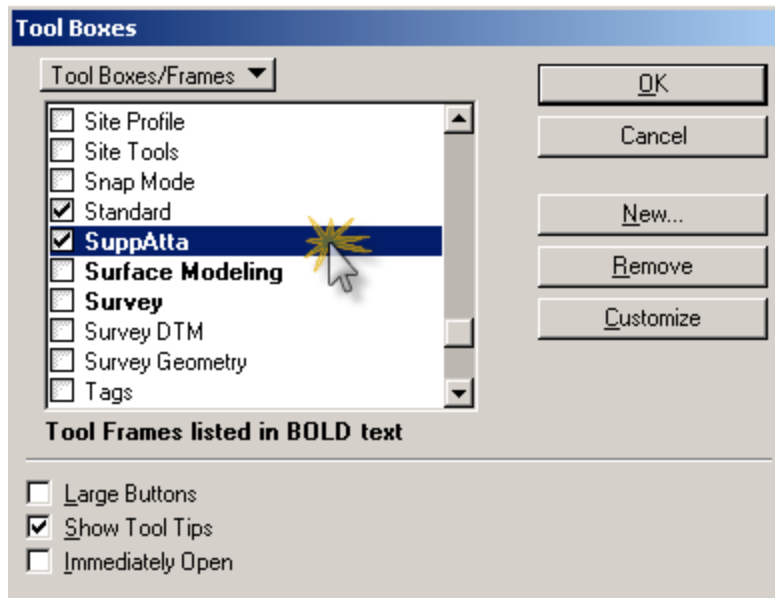


1. Setting an active angle
2. Placing Text at an active angle
3. Rotate by 3 Points
4. Rotate by Element
5. Rotate to Top View

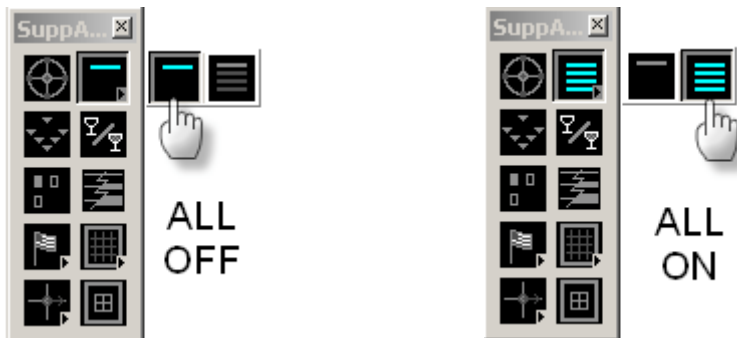
Close the U2547_rdy_pfl.dgn design file.

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Supplemental Attachment Tool Frame



All Reference File Models Display Off/On



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Shape Fill Display Toggle



Toggle button to display/not display fill areas.

Line Weight Display Toggle



Toggle button to relative element weigh or all element weight is displayed as 0.

DP In Same Location



Can be used with or without a fence. Mostly used to copy an element or a fence area from a file model to the active file model. Place a fence. Data Point on the screen to accept the fence area to copy. Click on DP in Same Location button to copy to same location. Same as key in "DL=0,0".

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Create Shape with Polygons



1 2 3 4

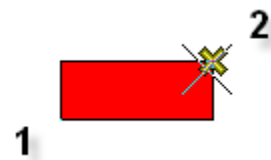
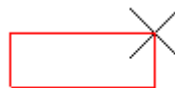
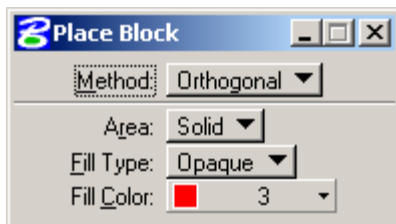
1. Place Block *
2. Place Shape
3. Place Orthogonal Shape
4. Place Regular Polygon

* When using the **Place Block** command, the two methods are **Orthogonal** and **Rotated**.

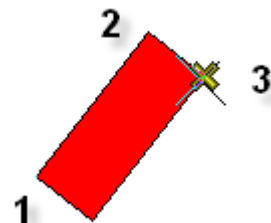
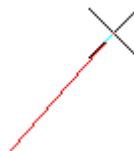
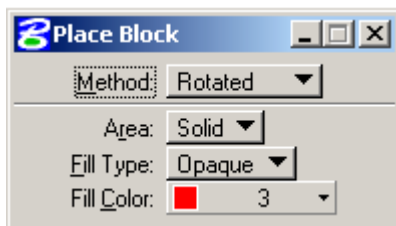


Place Block

Orthogonal



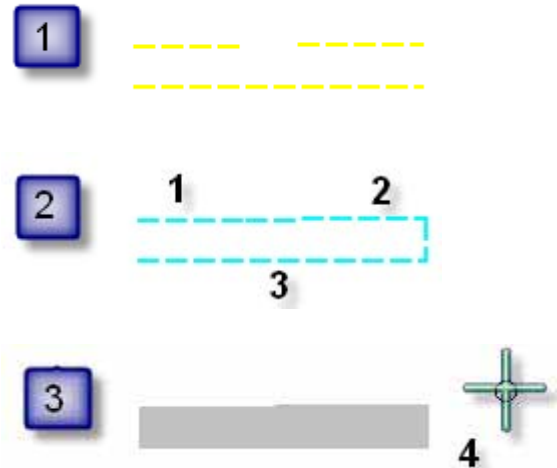
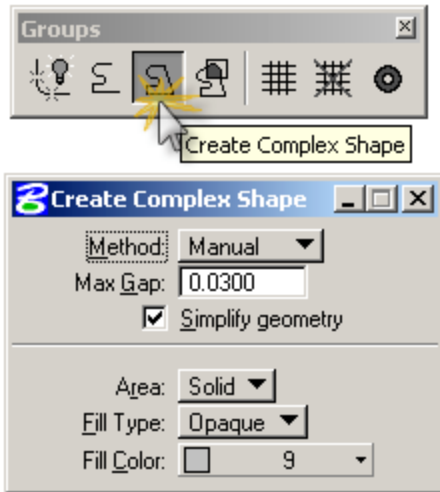
Rotated



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Create Complex Shape

(Manual Method)



STEP:

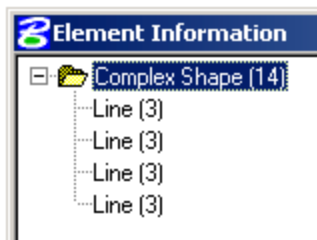
1. Evaluate the direction of outlining elements before creating the shape.
2. DP (1-3) on the outlining elements in the order determined. Note the gap between DP element 1 and 2 is automatically bridged with a line element.
3. DP (4) on the screen once to accept and right click on the mouse to complete the shape creation.

Note that outlining elements have to be in the active file model for this tool to work. The shape can not be created if the bounding elements are referenced. One of the advantages of this tool is that if a gap exists between two elements, then this tool will automatically bridge the gap with a line.

Simplify Geometry

This option determines if the shape created is be a Simple (Type 6) or Complex (Type 14) Shape. There is no advantage to selection one over the other. However, Roadway CADD Support for plotting purposes prefers having Simplify Geometry checked.

WITHOUT SIMPLIFIED GEOMETRY (UNCHECKED)



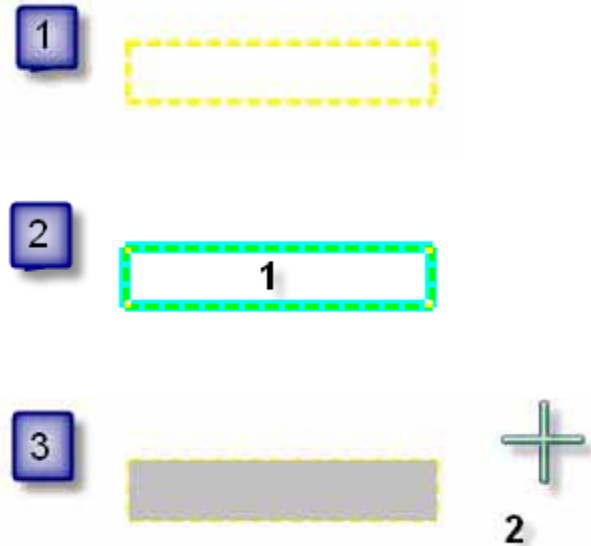
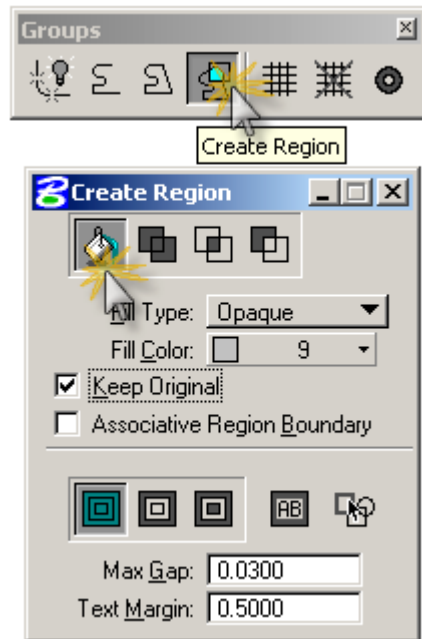
WITH SIMPLIFY GEOMETRY (CHECKED)



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Create Region

(Flood Area)



STEP:

1. Make sure all outlined boundaries are closed before creating the shape.
2. DP (1) anywhere inside the desired region to be “flooded”.
3. DP (2) on the screen once to accept and right click on the mouse to complete the shape creation.

Note if the Geopak D&C Manager RD_HearingMap.DDB is used to create shapes, by default the create region command is invoked. In contrary to the Create Complex Shape command, the outlining elements can be referenced or in the active file in order to create the shapes.

Keep Original

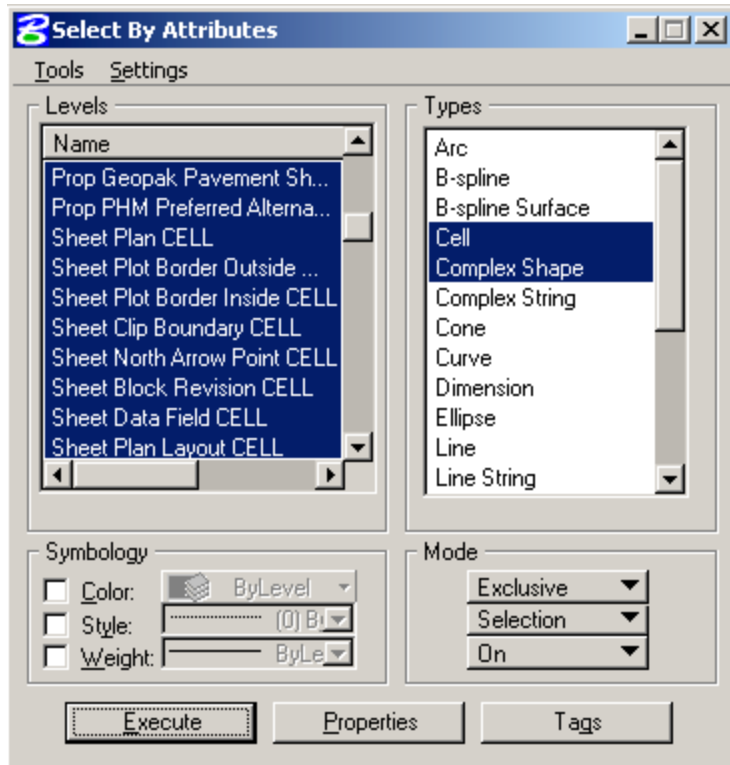
This option determines if the outlined elements used to create the shape is to be deleted after the shape has been created. Roadway CADD Support prefers having Keep Original checked initially. Once all the shapes have been created for the appropriate file model, then these outlined can be deleted. Use the select By Attributes tool to delete all elements except shape and complex shape elements for this.

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Select by Attributes

The Select by Attributes dialog box is used to select certain found in the active file model base on certain criteria. The following is from the Microstation Help file.

1. From the Edit menu, choose **Select By Attributes**. The Select By Attributes dialog box opens. The second option menu in the Mode section should be set to Selection.



2. (Optional) Use the controls in the dialog box to specify selection criteria. (To specify criteria based on element properties, click the Properties button and use the controls in the Select by Properties dialog box. To specify criteria based on tag values, click the Tags button and use the controls in the Select By Tags dialog box.)
3. In the Mode section, make sure On is chosen from the third option menu.
4. Click Execute. The elements meeting the specified selection criteria are highlighted.

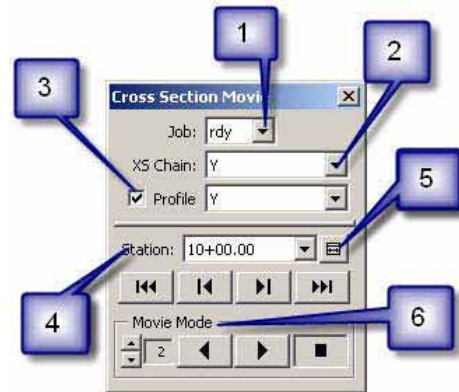
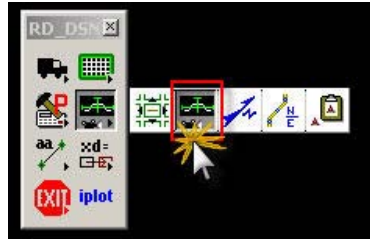
The above procedure can be adapted for locating (highlighting) elements or filtering their display based on their attributes. The effect of the Execute button in the Select By Attributes dialog box is controlled with the second option menu in the Mode section, which is set to Selection by default. The other options are Location and Display.

Sometime it is desired to deselect certain elements or select all elements except for what meet the criteria. To accomplish this, change the **Inclusive** option to **Exclusive** option under the Mode setting.

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Cross section Movie Navigator

From the **RD_DSN** Tool Frame select the **RD_VBA** Tool Family then select the **XS Movie Navigator** Tool Box



1. Job Number

After the application has been loaded, select the job number. This application searches for the GPK file in the Job (GPK) Directory set in the COGO preferences.

*** NOTE: Depending on how many cross section cells are associated a particular chain, the process of selecting the Job number will also load other information, i.e. stations, and it may take up to one full minute. This is normal and do not attempt to end this process.

2. XS Chain

After selecting the Job Number, the chain(s) found in the file is loaded into the XS Chain drop down combo box.

3. Profile

As an option, if Profile is checked and the corresponding profile for that chain is selected, then the profile grade is used to lock the view moving to and from cross section. If unchecked, default, then the green horizontal cross section cell line is used to lock the view moving to and from cross sections. Ideal application is in mountainous projects, where drastic elevation differences are encountered moving from one cross section to the next.

4. Station

If the correct Job Number and XS Chain is chosen, then the station list is populated. Navigation from one station to another can be done by three methods, the drop down station combo box, the DVD style buttons, or the automatic movie mode.

5. **Fit XS To View** button to reset the view to fit the cross section view to the width of the green cross section cell.

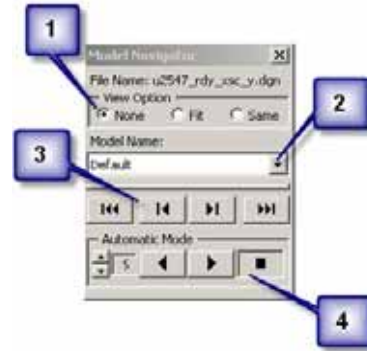
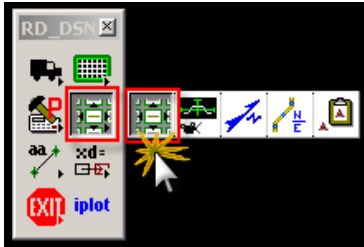
6. Navigation

A very effective method of cross section navigation, the DVD style buttons, (1) First (2) Previous (3) Next (4) Last cross section can be used. Under **Movie Mode**, the Play Reverse, Play Forward, and the Stop buttons can also be used. The **frame rate** can also be set. Default is 2 frames per second, and it can be to a maximum of 32 frames per second. The higher the frame rate, the faster the movie plays from one cross section to the next.

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Model Navigator

From the **RD_DSN** Tool Frame select the **RD_VBA** Tool Family then select the **Model Navigator** Tool Box



Note:

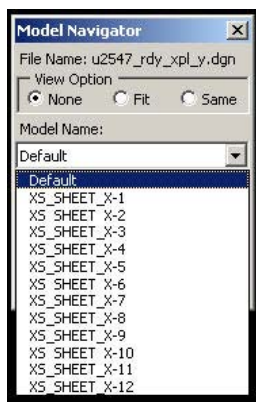
After the application has been loaded, the **current design file name** and the **current active model name** are displayed.

1. View Option

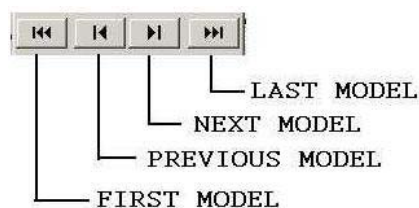
- None - With the next model opened, no view intervention is applied. That view will be the last view area of model.
- Fit - With the next model opened, that view will be "fitted" to screen of all graphical elements displayed. An example application of this view option is when navigating through cross section sheets (XPL).
- Same - With the next model opened, that view will be same as the previous model view. An example application of this view option is if the DSN file is composed of many models, right of way, horizontal alignment, and slope stake. Navigating through these models will have the same view area as the previous model view. Similar to RD_AutoXD.

Three ways to navigate with the Model Navigator. Automatic Mode

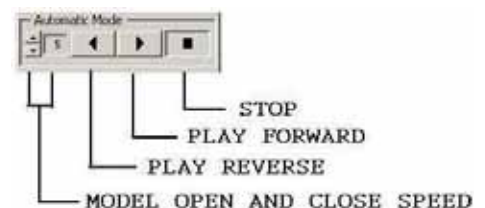
2. Drop Down Combo



3. Navigation Buttons



4. Automatic Mode

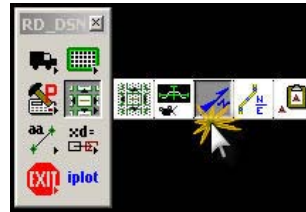


Note: that the Model Open and Close Speed setting is in seconds. Fastest speed is 1 second between models. Slowest speed can be set to 10 seconds between models.

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Sheet North Arrow Placement (SNAP)

From the **RD_DSN** Tool Frame select the **RD_VBA** Tool Family then select the **SNAP** Tool Box



Initial State

1. Current Folder

After the application has been loaded, click on the Browse button to select the location of the folder where the plan sheet files (PSH) are. Notice the messages in the lower left corner that will guide you through the program.



2. Files In Folder

These are the list of Microstation DGN files found under the Current Folder selection.

3. Files To Process

Microstation DGN files to place the north arrow cell in. Mostly Roadway Plan Sheet files (PSH).

4. Move Selected Files for Processing

Selected files in the Files In Folder list will be moved to the Files To Process list.

5. Move All Files for Processing

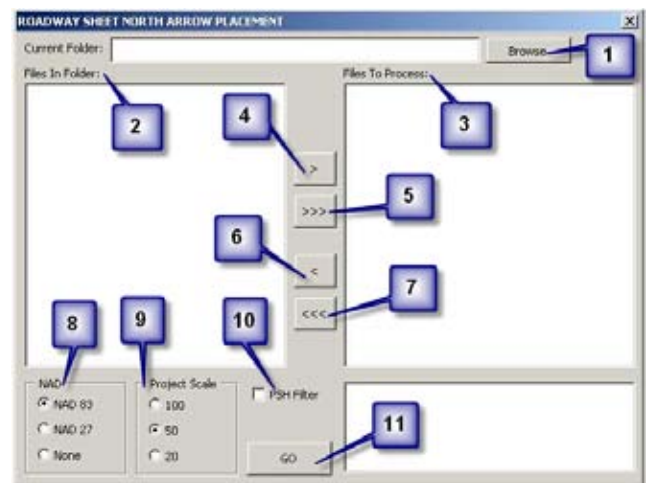
All files in the Files In Folder list will be moved to the Files To Process list.

6. Remove Selected Files from Processing

Selected files in the Files To Process list will be moved to the Files In Folder list.

7. Remove All Files from Processing

All files in the Files To Process list will be moved to the Files In Folder list.



Note: Double clicking on a file will also move the file from one list to the other

8. NAD - North American Datum MSL Datum Year

North arrow cell to be placed.

NAD83 (1983)

NAD27 (1927)

None (North arrow cell with no NAD designation)

9. Project Scale

Determine the size of north arrow cells. Project scale is equivalent to plot scale at full size plan sheets (22"x34").

10. PSH Filter

Toggle to display only Roadway plan sheet (PSH) file type files in the Files In Folder list (i.e. R2007_RDY_PSH_S04.DGN).

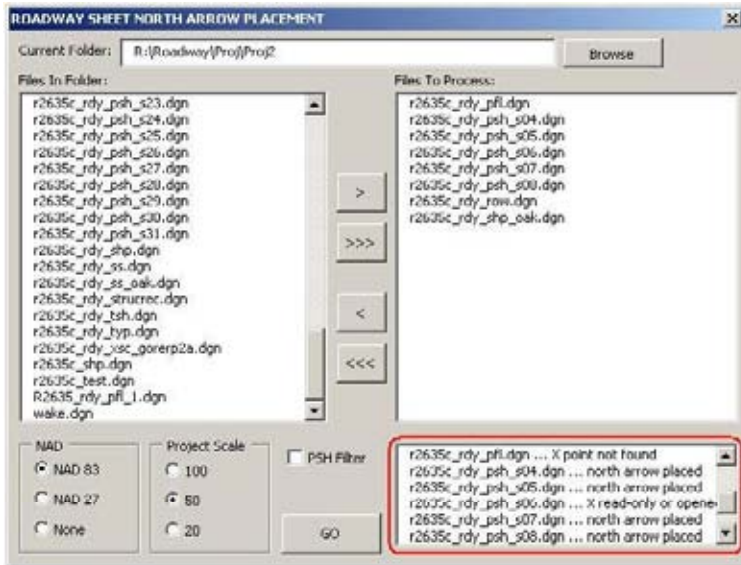
11. GO

Process all the file in the Files To Process list in order. During processing, in the lower left corner of the screen, the stoups of the processing is displayed.

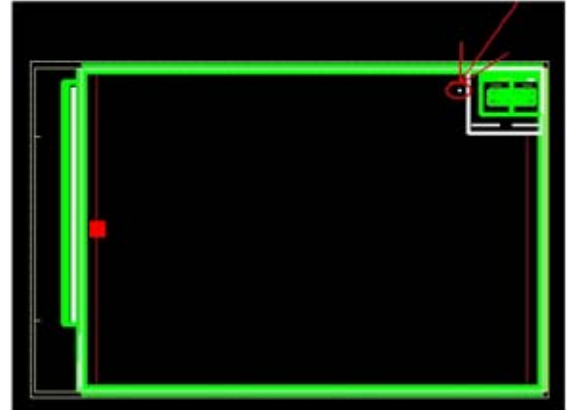


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Once completed, then a log of the event is displayed to the right of the **GO** button.



For each file in the list to be processed, the program will open each file and scan for a point on level "Sheet North Arrow Point CELL". The newer plan sheet cells as of February 26, 2007 will have this point located in the upper right corner.



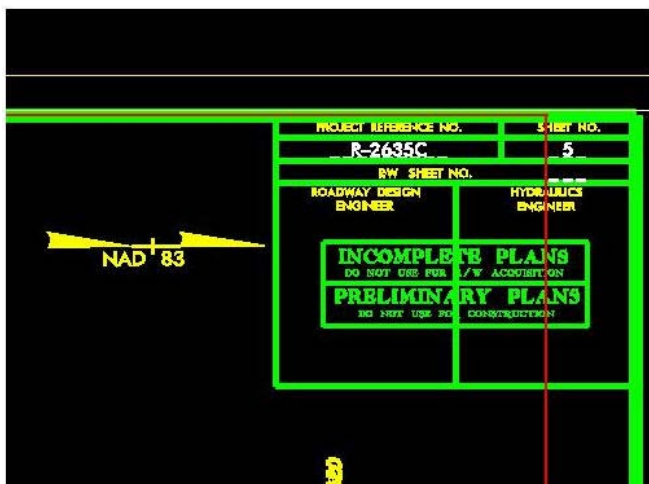
If the file is read only or is opened, then the program will go to the next file on the list.

If the new plan sheet cell is still a cell, complex status has not been dropped, then the program will drop the complex status of the plan sheet cell once, and then continue to scan for the north arrow point.

If the new plan sheet cell complex status has already been dropped, then the program will automatically scan for the north arrow point.

If the north arrow point is found, then the appropriate north arrow cell is placed on the point once.

Rotation of the north arrow is to North, or top view. The file is then saved.



If the north arrow point is not found, then no north arrow cell is placed.

The file is then closed and the program goes to the next file on the list until all files have been processed.

Note: If the **Geopak Plan and Profile Sheet Layout** program is used to create the plan sheet files, for clip sheets option, use "**Rotate View**" for **plan** sheets and for **profile** sheets, use "**Rotate Reference**".

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Microstation Status Bar

The following is from a Microstation help file:

The Microstation Status Bar provides prompts, context-sensitive assistance, and some interactive functionality.



Selected tool > prompt

Shows the name of the selected tool or view control and (usually) a prompt for the next step in the normal procedure for using it.

Message Center

Shows system message information. Clicking in the Message Center portion of the status bar opens the Message Center dialog box. This dialog box contains a running log of system messages and any further description about the message if applicable.

Snap mode

Shows the type of snap selected.

Clicking the Snap Mode field posts the pop-up Snap Modes menu. The effect is the same as pressing the Tentative button while holding down the <Shift> key.

Locks icon

Clicking the Locks icon provides access to the Locks submenu. (It does not indicate status information.)

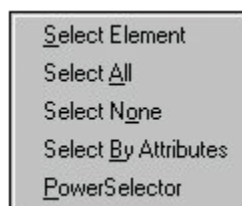
Active level

Shows the Active Level setting.

Clicking the Active Level field opens the [Level Manager dialog box](#), which is used to control level display and level symbology for the open DGN file and attached references.

Element selection indicator

If shown, indicates elements are selected and displays the number of selected elements.



Element Selection pop-up

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Clicking the status bar when it shows the number of selected elements opens a pop-up menu containing the following items:

Pop-up menu item	Choose to
Select Element	Select an elements in the active model.
Select All	Select all elements in the active model (effect is same as choosing Edit > Select All).
Select None	Deselect all elements in the active file (effect is same as choosing Edit > Select None).
Select By Attributes	Open the Select By Attributes dialog box (effect is same as choosing Edit > Select By Attributes).
PowerSelector	Select PowerSelector .

Fence indicator

If shown, indicates the fence mode of the fence that was placed. To place the fence, use a fence placement tool in the [Element Selection tool box](#).

DGN workmode

Indicates which workmode is in effect. In DWG (“DWG”) mode, certain functionality is disabled by default in order to restrict MicroStation to creating only information that can be stored in DWG format.

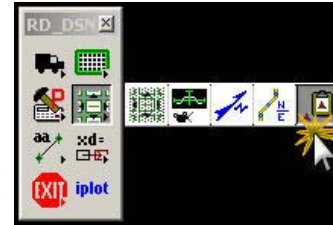
DGN file changes indicator

If a “diskette icon” is shown in the lower right-hand corner, it indicates that the DGN file has been modified during the current session. If the preference Automatically Save Design Changes is off, it indicates that there are changes that have not been saved. If the diskette is red and has an “X” through it, it means that the file is read-only.

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Copy Level Name to Clipboard

From the **RD_DSN** Tool Frame select the **RD_VBA** Tool Family then select the **Copy Level Name to Clipboard** Tool Box



Overview

This program copies the level name of any selected element into the system's clipboard. Since the level name is a text string, any application like UltraEdit, NotePad, Word, Excel, Microstation Word Processor and key in field, some Geopak processes and many more that uses the system clipboard to store and retrieve data, can use this feature. In Roadway, in our input files, like Criteria and Earthwork inputs, requires users to manually key in level names. This tool should help with efficiency and accuracy.

Open the **U2547_rdy_shp.dgn** design file.

Step 1.

Select the Microstation graphical element
Prop Geopak Pavement Shape Dependent



Note:

The **prompt** field confirms the level name of what was selected. Also at the same time, the same level name is being copied to the system's clipboard and stored.





Step 2.

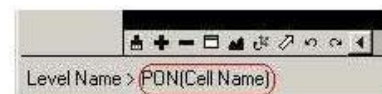
Open the application you want the level name copied to. For this demo, open the Criteria input file named **Cri_Y_for clipboard.inp** in UltraEdit and paste the level name in this file as shown below.

```
SHAPE SET
TYPE = CMP_SHAPE
lvname=
```

```
SHAPE SET
TYPE = CMP_SHAPE
lvname= Prop Geopak Pavement Shape Dependent
```

Note:   can also be used to paste the level name into any of the applications.

Note: If you select a cell element, before complex status has been dropped, it will store the cell name. That's because a cell can have more than one level name.



Step 3. To **END** the program just reset with the right mouse button or choose another Microstation tool.

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Centerline Coordinate List

Note: Refer to [Centerline Coordinate List Memo](#), August 25, 2003 on the Roadway Web under Cadd Memos

Overview

The Centerline Coordinate List Program is broken out into three major components.

- Set COGO Information
- Create Centerline Coordinate List
- Create Centerline Coordinate Sheet

Step 1.

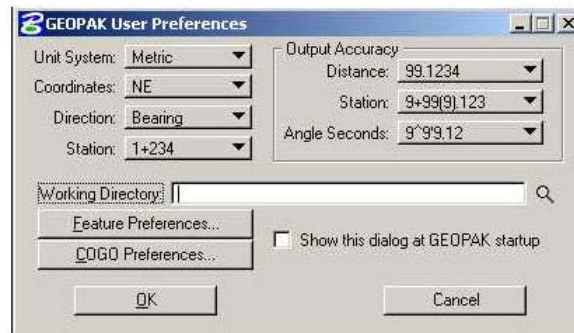
Set Cogo Information

Optimal Settings for Geopak COGO User Preferences

ENGLISH

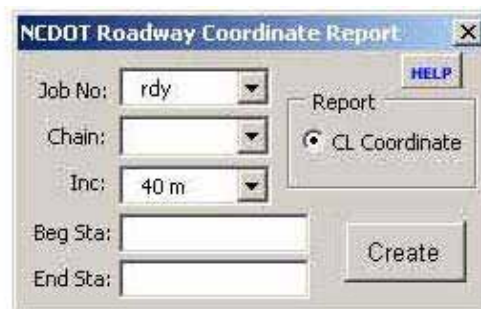


METRIC



Note: The differences between the station formats and output accuracy in stationing and angle depending on the Unit System used. This is a direct correlation to the preferences used in NCDOT

Initial State of the Centerline Coordinate List Program



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Note: Once the **Job Number**, **Chain**, and **Increment** distance have been selected, the Beginning and Ending Station fields are **automatically** populated.

Designers can edit the Beginning and Endings Station fields by keying in the numeric station values and it will automatically reformat to the station format. If a station entered is not within the selected chain, the beginning or ending station is entered in its place. Anytime the Designer wants to know the beginning and ending stations for a selected Chain, place the mouse pointer to the **Beg Sta:** or **End Sta:** label and then the station information is displayed.

Note: As an added feature, if either of these two labels is clicked on, the beginning and ending stations are reset back to the original default value.

Step 2.

Create Centerline Coordinate List

Point #	Chain	Station	Northing (Y)	Easting (X)
1	L	10+00.00	1014682.1558	1895282.5400
2	L	11+00.00	1014614.9361	1895356.5773
3	L	12+00.00	1014547.7164	1895430.6145
4	L	13+00.00	1014480.4967	1895504.6518
5	L	14+00.00	1014413.2770	1895578.6890
6	L	15+00.00	1014346.0574	1895652.7263
7	L	16+00.00	1014280.8817	1895728.5299
8	L	17+00.00	1014223.3192	1895810.2504
9	L	18+00.00	1014174.2027	1895897.3092
10	L	19+00.00	1014132.8528	1895988.3456
11	L	20+00.00	1014092.6216	1896079.8958

An Excel Centerline Coordinate List is generated when the **CREATE** button is Clicked.

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Note: The **Job Number** combo box has changed color to red and it is now **locked**.

Note: The Program prompts the Designer if additional Chains are to be **appended** to the list.

The dialog box titled "NCDOT Roadway Coordinate Report" contains the following fields and controls:

- Job No: rdy (locked dropdown menu)
- Chain: L (dropdown menu)
- Inc: 100 ft (dropdown menu)
- Beg Sta: 10+00.00 (text field)
- End Sta: 35+84.02 (text field)
- Report: CL Coordinate (radio button)
- Buttons: HELP, Create

25	L	34+00.00	1013275.2396	1897142.3158
26	L	35+00.00	1013184.9204	1897185.2396
27	L	35+84.02	1013109.0365	1897221.3030
28	Y	10+00.00	1013680.9075	1896564.2280
29	Y	10+50.00	1013730.4310	1896571.1144
30	Y	11+00.00	1013779.7916	1896579.0224

The dialog box titled "NCDOT Roadway Centerline Coordinate List" contains the following text and controls:

- Message: Centerline coordinate list has been generated for Chain -L-. Would You like to append another centerline coordinate list with another Chain?
- Buttons: Yes, No

Error Messages

Note: There are a series of tests the program goes through at this stage. Three of which are considered "critical" and will **exit** the program completely. The series of tests are performed in this order with the corresponding error and action to fix message.

The dialog box titled "NCDOT Roadway Centerline Coordinate List" displays a critical error:

- Icon: Red X
- Text: CRITICAL: NCDOT V8 Workspace NOT found.
- Action: ACTION: Set value for system environment variable NCDOT_V8_WORKSPACE_DIR. Exiting Program ...
- Button: OK

Critical error raised if NCDOT V8 Workspace not configured and set.

The dialog box titled "NCDOT Roadway Centerline Coordinate List" displays a critical error:

- Icon: Red X
- Text: CRITICAL: File "XY_Coord.xls" NOT found.
- Action: ACTION: Check to see if this file is in the \\[Workspace Dir]\\ROADWAY_STDS\\Standards\\data\\ folder. Exiting Program ...
- Button: OK

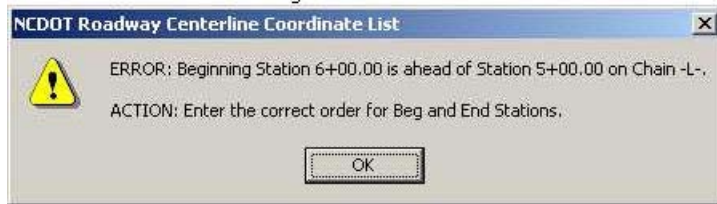
Critical error raised if the Excel template file used in the program is not found.

The dialog box titled "NCDOT Roadway Centerline Coordinate List" displays a critical error:

- Icon: Red X
- Text: CRITICAL: NCDOT Roadway Centerline Coordinate List Excel file has been terminated.
- Action: ACTION: Restart new procedure for creating the Centerline Coordinate List. Exiting Program ...
- Button: OK

Critical error raised if the Excel spreadsheet file has been terminated when the program is going to write to it.

NCDOT ROADWAY PLAN PREPARATION



Error raised if the chain stationing is not in the correct order.



Error raised if the beginning chain station is not within the chain.



Error raised if the ending chain station is not within the chain.



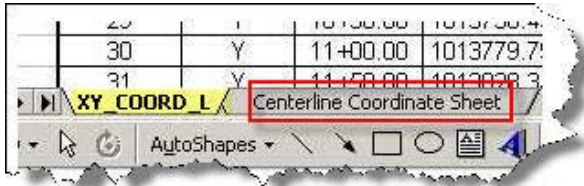
Error raised if the beginning chain station is not an even station.



Warning message raised if the beginning chain station is not an even 100 station.

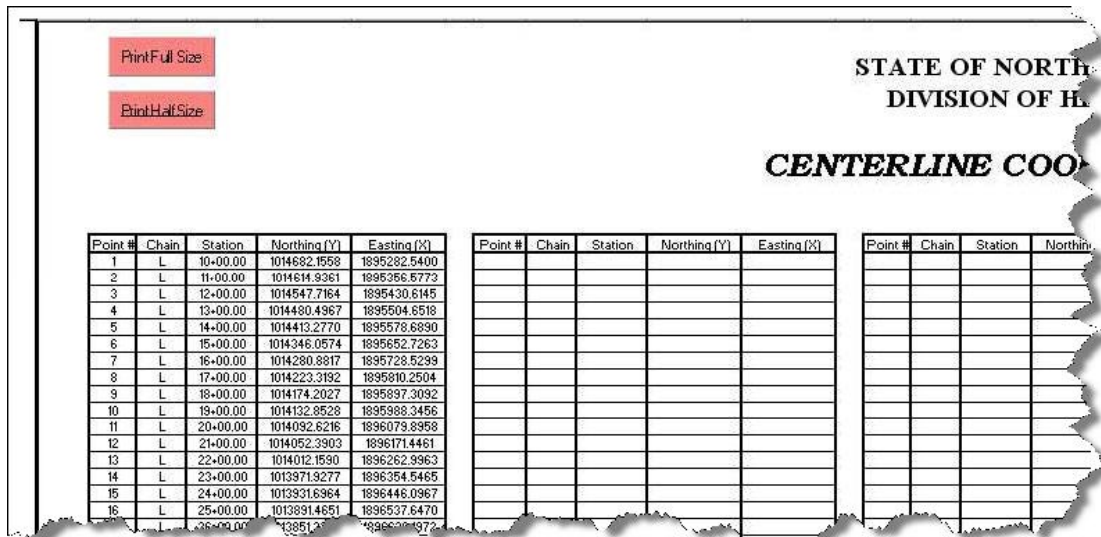
NCDOT ROADWAY PLAN PREPARATION

Create Centerline Coordinate List Sheet

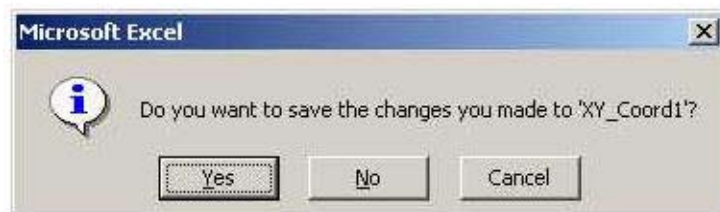


While the Centerline Coordinate List (XY_COORD_L) is being generated, the Centerline Coordinate Sheet (Centerline Coordinate Sheet) is also being generated. There are two sheets with a maximum of 820 point numbers.

Note: The "Easy" print buttons have been created for **Roadway Design** prints only with the Centerline



Before closing, the spreadsheet, Designers are prompted to save the generated spreadsheet file. If the spreadsheet is to be saved, then save as an Excel (XLS) file in the \\Roadway\Proj folder.



NCDOT ROADWAY PLAN PREPARATION

Data Cleanup

Data Cleanup - Microstation Help

The following is from a Microstation help file:

Design File Cleanup dialog box

Used to identify duplicate elements, overlapping elements and/or gaps between elements in the active design file.

Duplicate — two elements of the same type that share the same location and geometry.

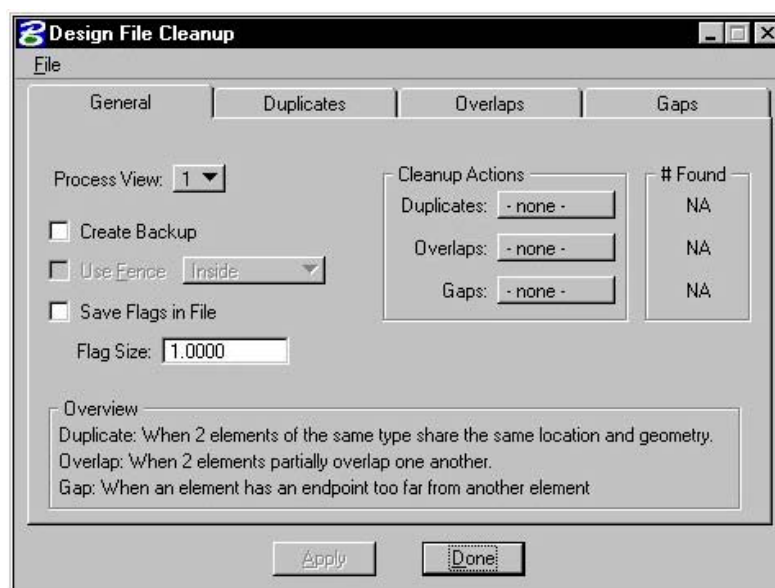
Overlap — two elements that partially overlap one another.

Gap — when an element has an endpoint too far from another element.

Cleanup actions are performed via the **Design File Cleanup** dialog box. You can set the desired cleanup action(s) from the dialog box's General tab, or you can go to each cleanup action's individual tab and set the cleanup action as well as further restrict or expand the search criteria.

Some cleanup actions can be performed simultaneously. For example, you can instruct Design File Cleanup to select all Duplicates and flag all Overlaps at the same time. When running Interactive mode, no other cleanup actions can be performed.

Results of cleanup actions are displayed in the # Found section on the **Design File Cleanup** dialog box's General tab, as well as in MicroStation's status bar.



Design File Cleanup dialog box

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Apply

Accepts the settings and searches the design file for duplicate elements, overlapping elements and/or gaps between elements.

Done

Closes the dialog box when you have finished your cleanup actions.

File > Load Settings

Opens the Load Cleanup Settings dialog box, which is used to load previously saved Design File Cleanup settings.

File > Save Settings

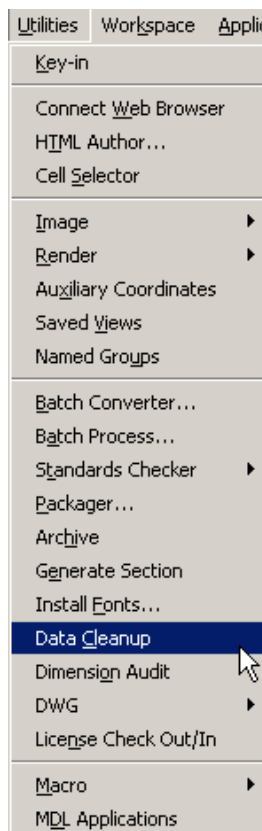
Opens the Save Cleanup Settings dialog box, which is used to save the current Design File Cleanup settings to a file which can be loaded later.

File > Default Settings

Restores the default settings for Design File Cleanup

Data Cleanup -Roadway Cadd Support Method

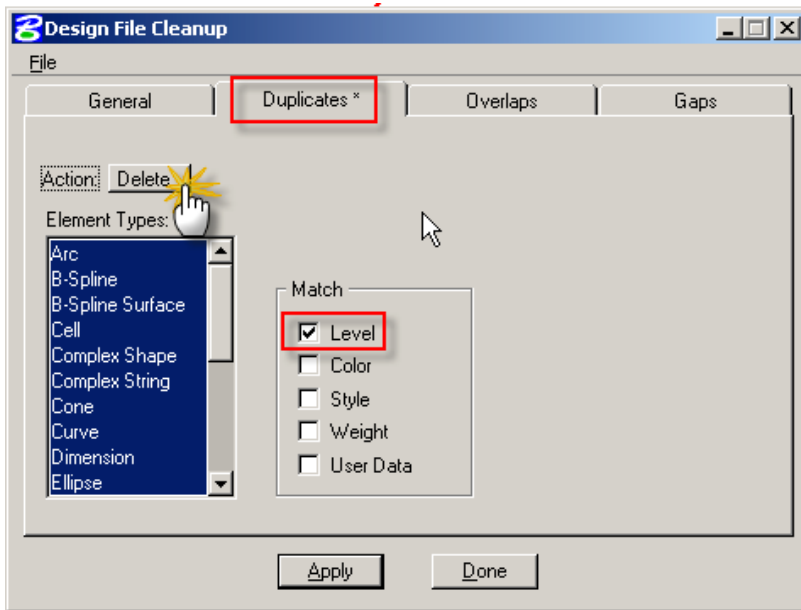
Roadway Cadd Support recommends using Data Cleanup for deleting Duplicate elements



Step 1.

In a Microstation file go under **Utilities** then **Data Cleanup**

NCDOT ROADWAY PLAN PREPARATION



Step 2.

- A. Select the **Duplicates** Tab
- B. Set the **Action** to **Delete**
- C. Check on **Level** to Match
- D. Select **Apply**